Darden Mill Run, Mill Swamp and Three Creek Clean-up Plan

Final Public Meeting

March 21, 2013

Why are we here?

- Present a year's worth of work
  - TMDL Study
  - Work Group
- Questions and Comments
- Confirm YOUR Support

Tonight's Agenda

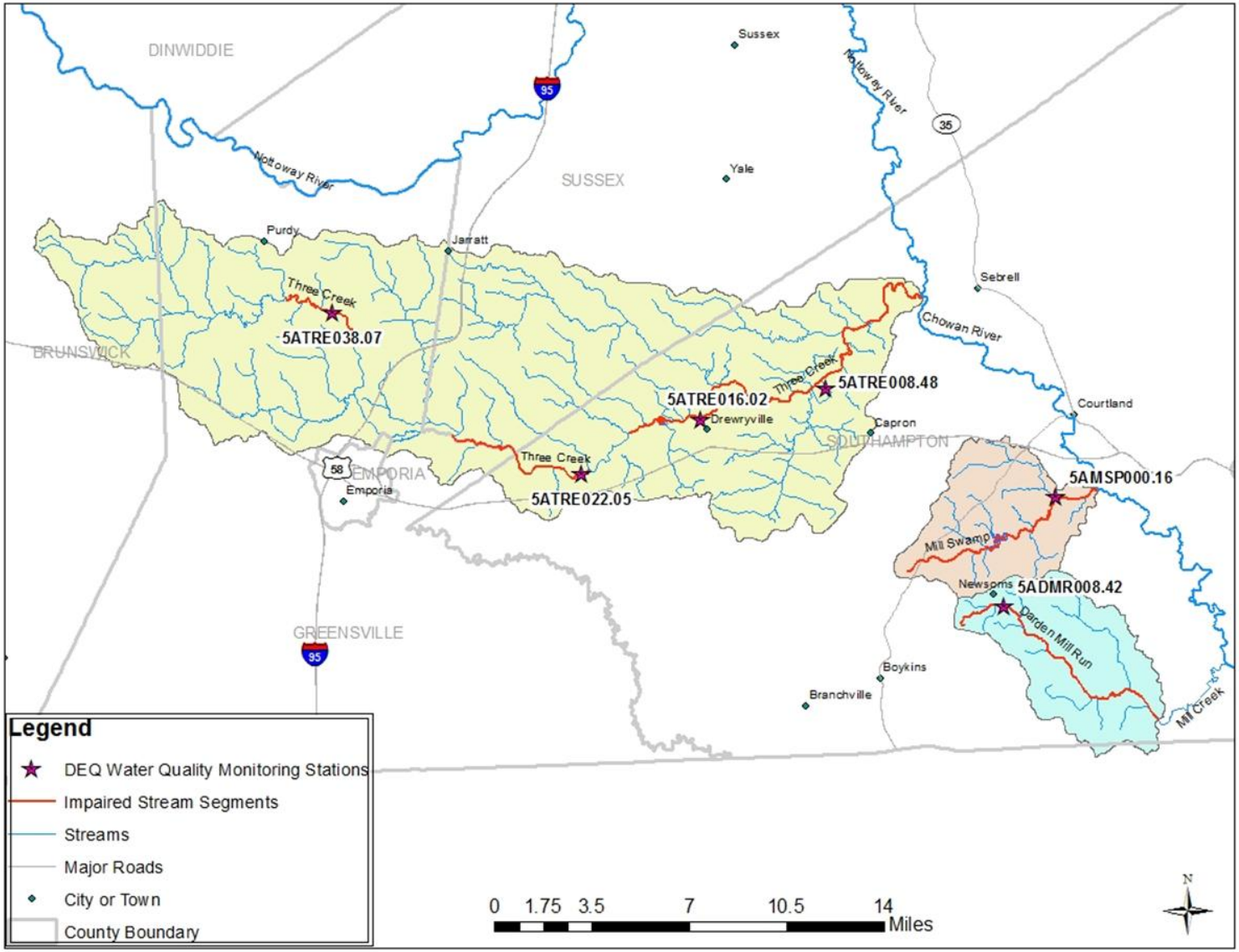
Welcome –
Jennifer Howell, Virginia Department of Environmental Quality

The Implementation Plan Overview –
Karen Kline, Virginia Tech

Questions and Answers about the Plan and Implementation

Next Steps –
Jennifer Howell, Virginia Department of Environmental Quality

Impaired Segments



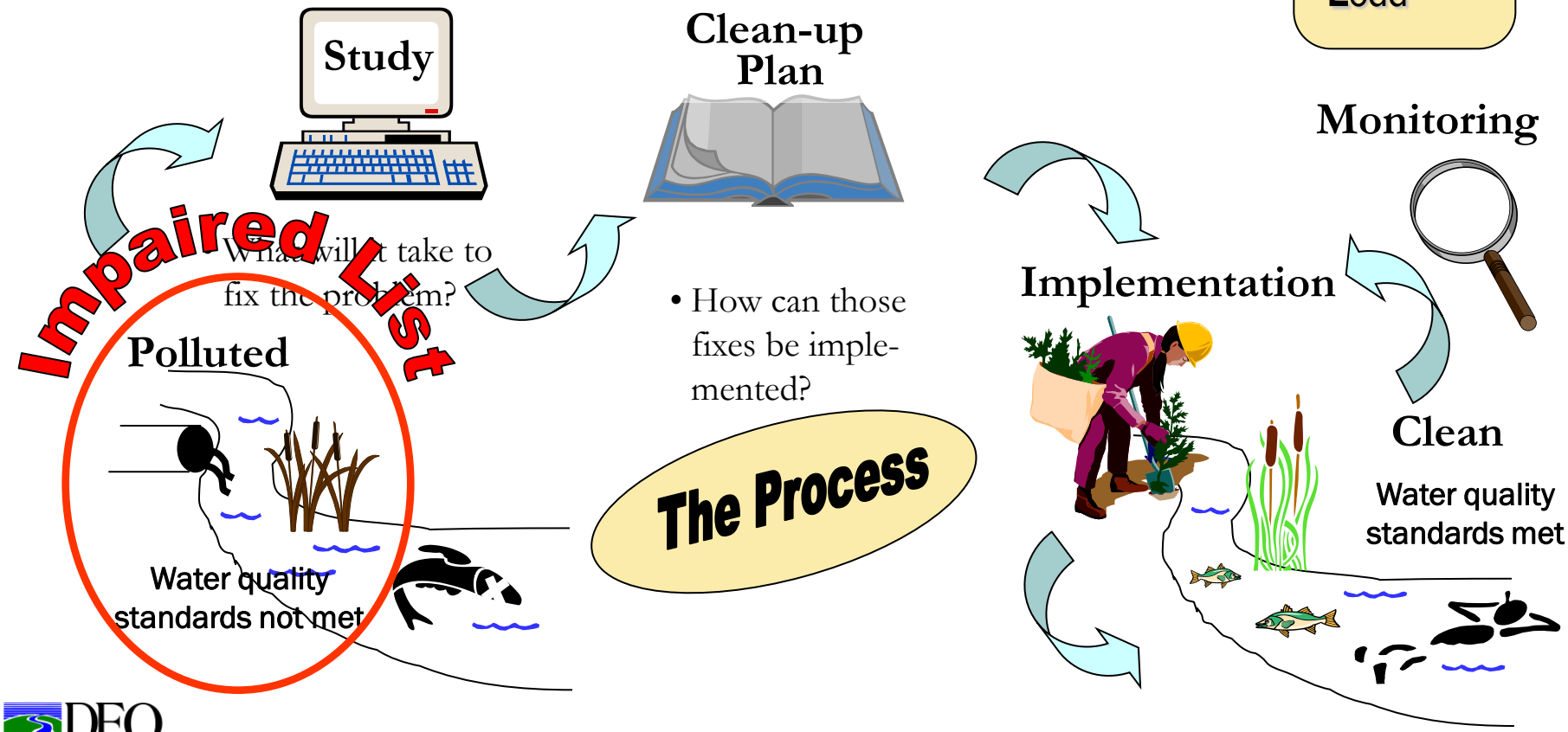
Presentation Outline

- Overview of TMDL Development
- Overview of Implementation Plan
- Public Participation
- Assessment of Needs
- Implementation Actions
- Cost/Benefit Analysis
- Potential Funding Sources
- Implementation Timeline
- Tracking Progress of Implementation

What Happens When a Stream is Impaired?

- The State begins a formal process to clean up that water body

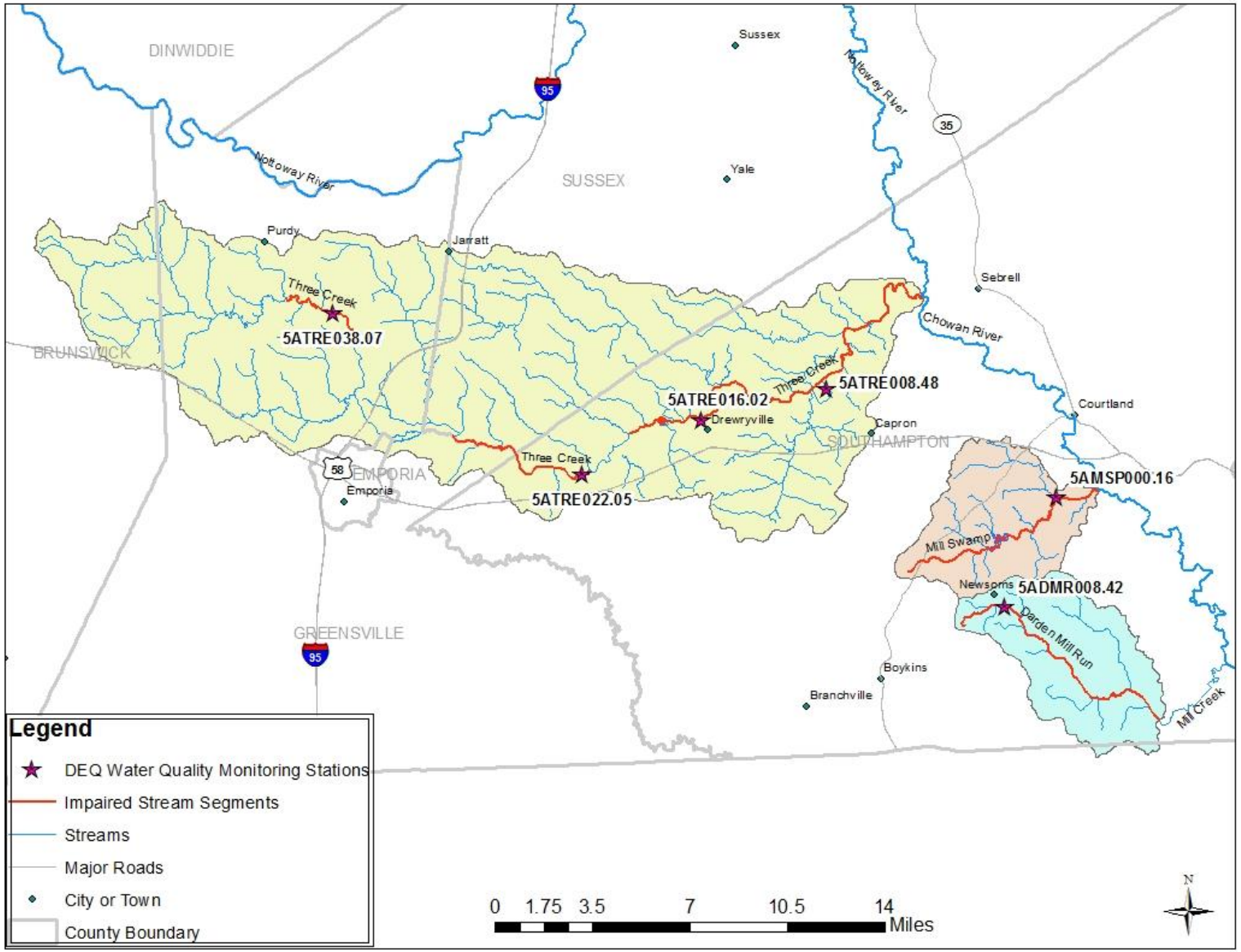
Total
Maximum
Daily
Load



Graphic adapted from Dr. Robert Brent, Virginia DEQ

Bacteria Impairment

More than 10% of the time, the stream is not meeting the State's bacteria standard for primary contact recreation



Consequences of a Bacterial Impairment

- Bacteria live in the bodies of warm-blooded mammals (i.e. humans or animals)
- Presence of fecal coliforms indicates that other disease-causing organisms may be present

<u>Human Health Concern</u>

- Chance of gastrointestinal illness or infection during primary contact (e.g., water in mouth, nose, eyes, open wounds)

What Happens When a Stream is Impaired?

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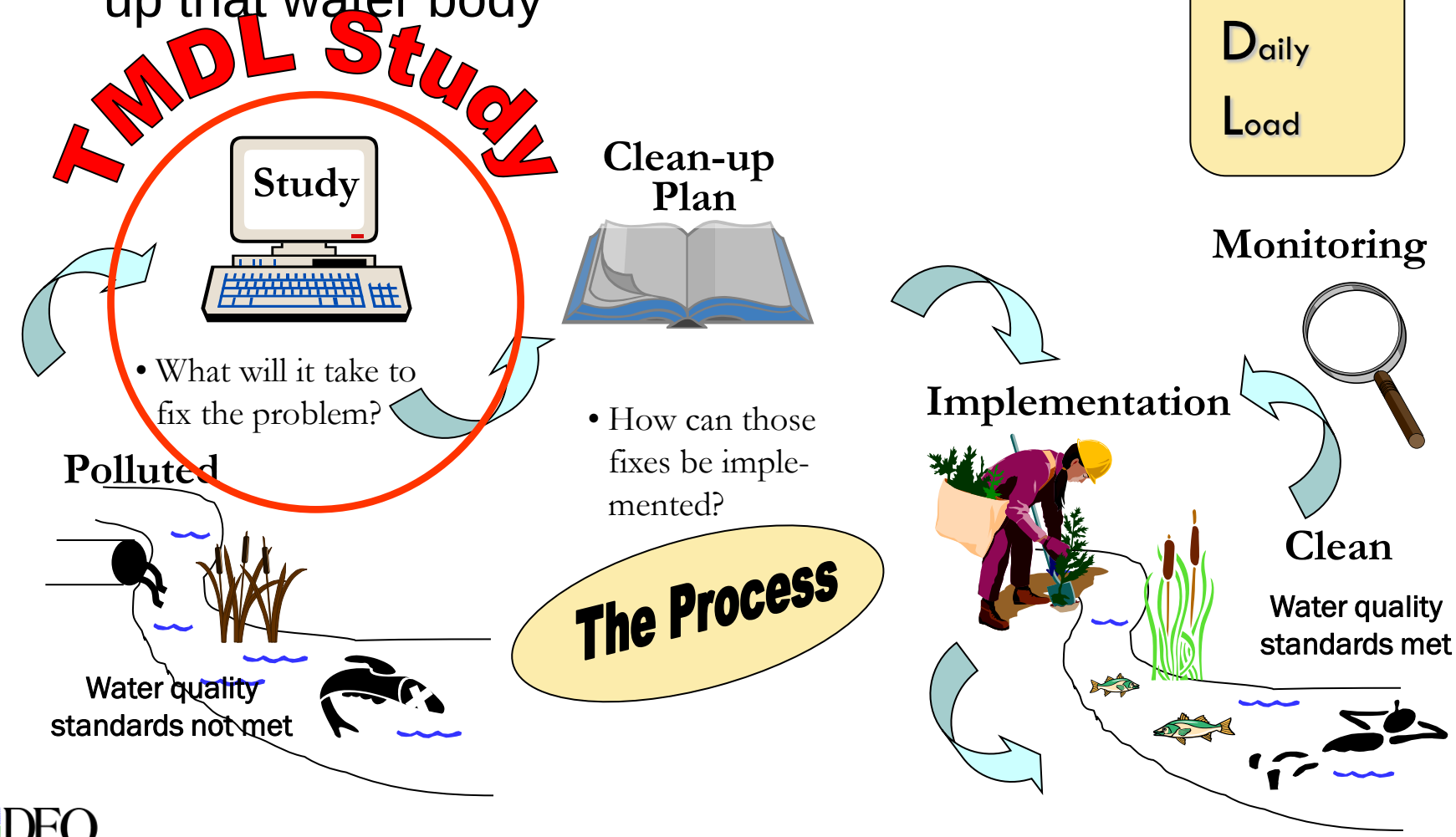
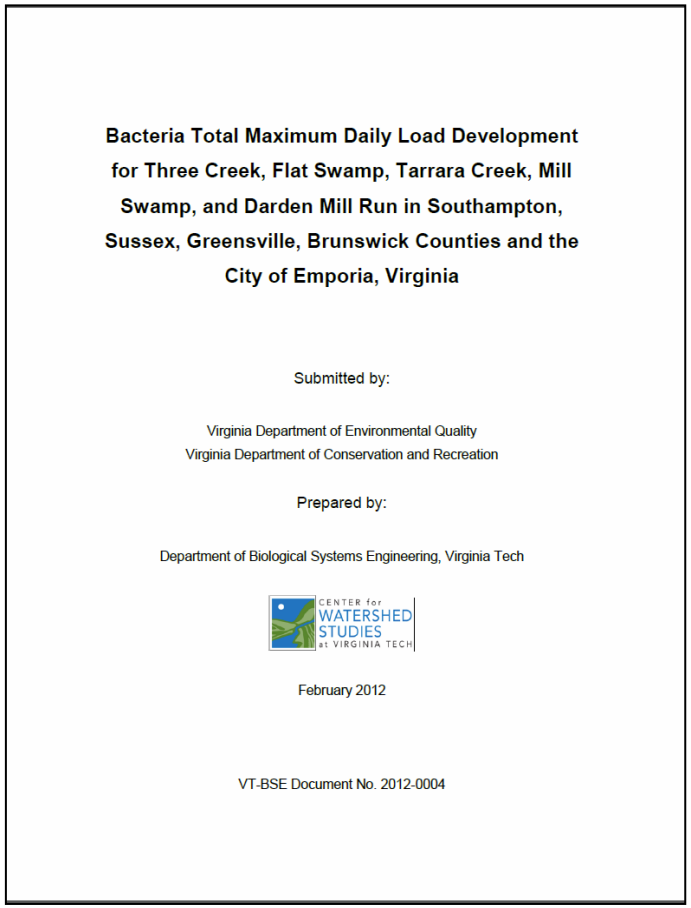
Total
Maximum
Daily
Load



Graphic adapted from Dr. Robert Brent, Virginia DEQ

The Study

- Completed in February 2012
- Provided information on:
  - Land uses in the area
  - Sources of bacteria in the watershed
  - Reductions in those sources necessary to meet water quality standards



Bacteria Total Maximum Daily Load Development for Three Creek, Flat Swamp, Tarrara Creek, Mill Swamp, and Darden Mill Run in Southampton, Sussex, Greensville, Brunswick Counties and the City of Emporia, Virginia

Submitted by:

Virginia Department of Environmental Quality
Virginia Department of Conservation and Recreation

Prepared by:

Department of Biological Systems Engineering, Virginia Tech

CENTER for WATERSHED STUDIES at VIRGINIA TECH

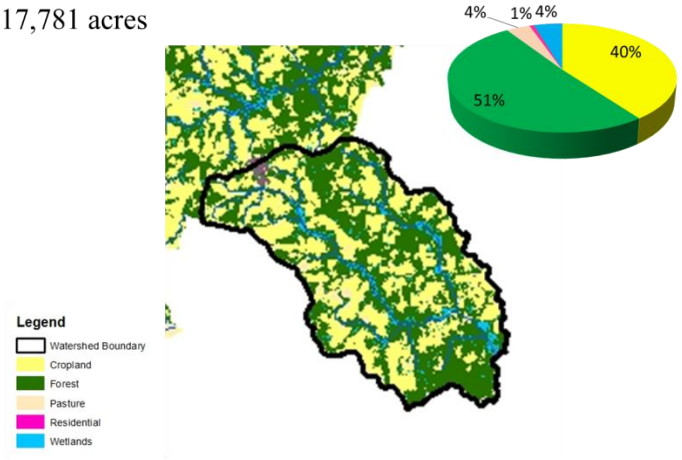
February 2012

VT-BSE Document No. 2012-0004

Major Land Uses

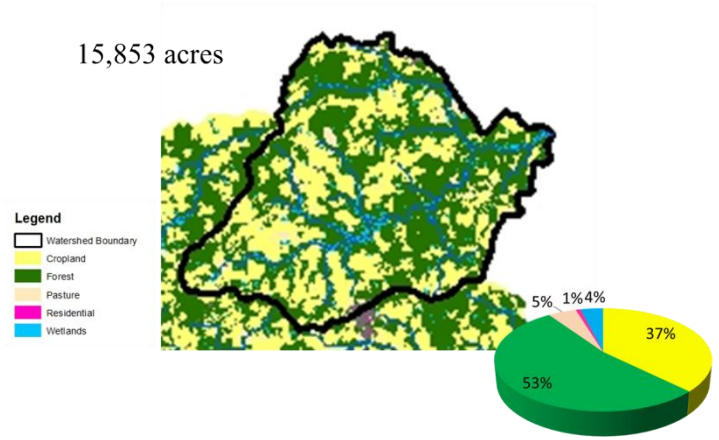
Darden Mill Run Land Use

17,781 acres



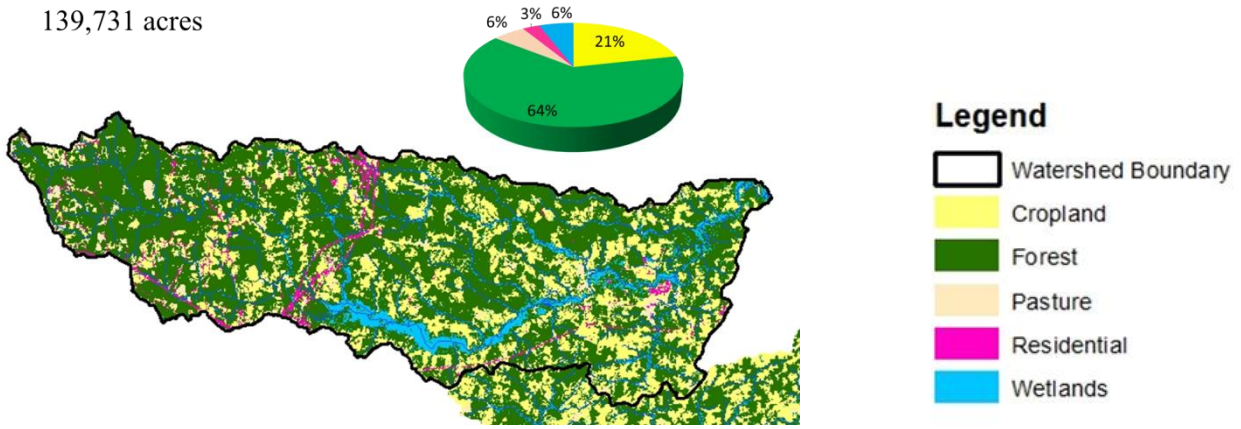
Mill Swamp Land Use

15,853 acres



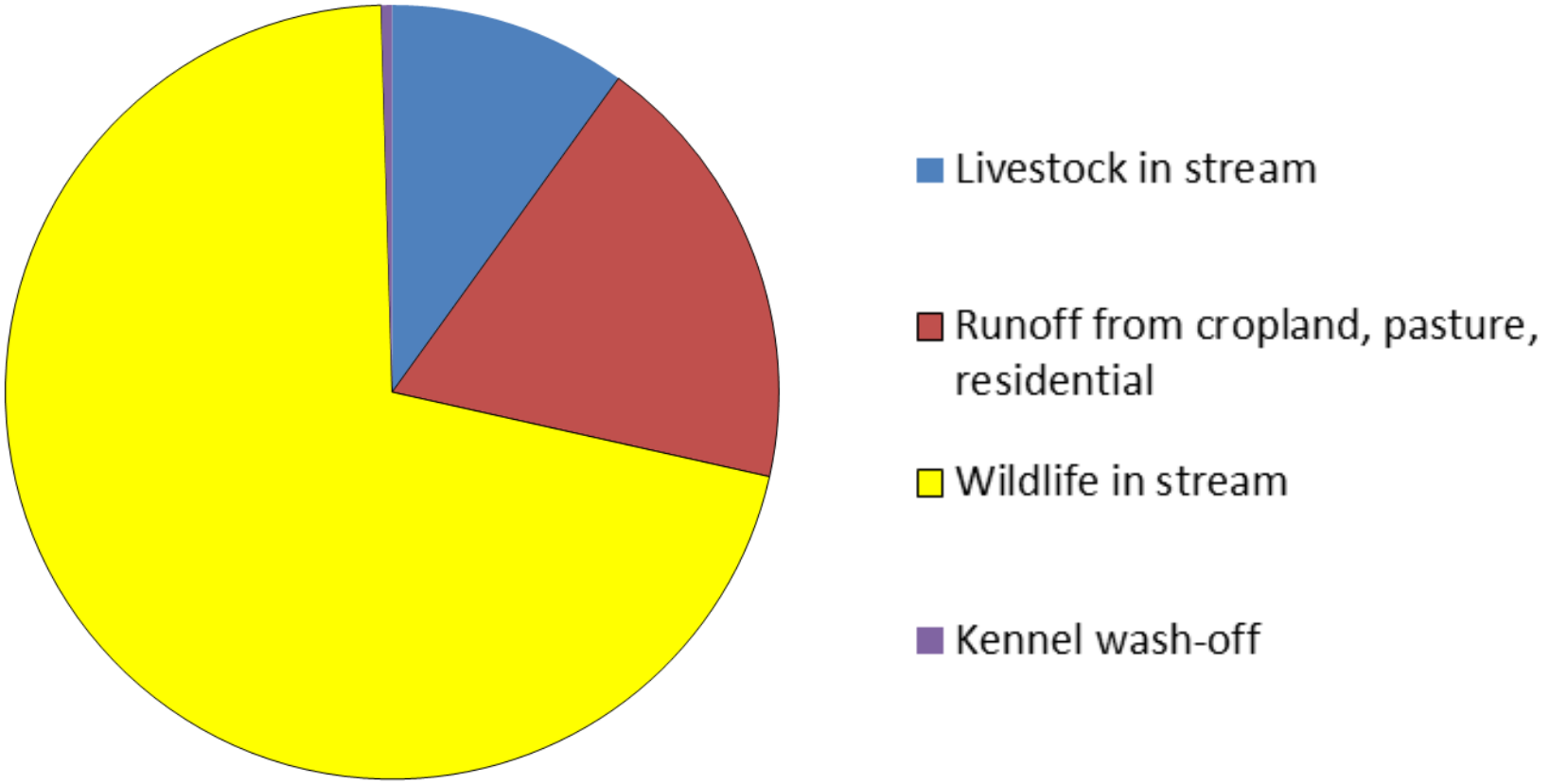
Three Creek Land Use

139,731 acres



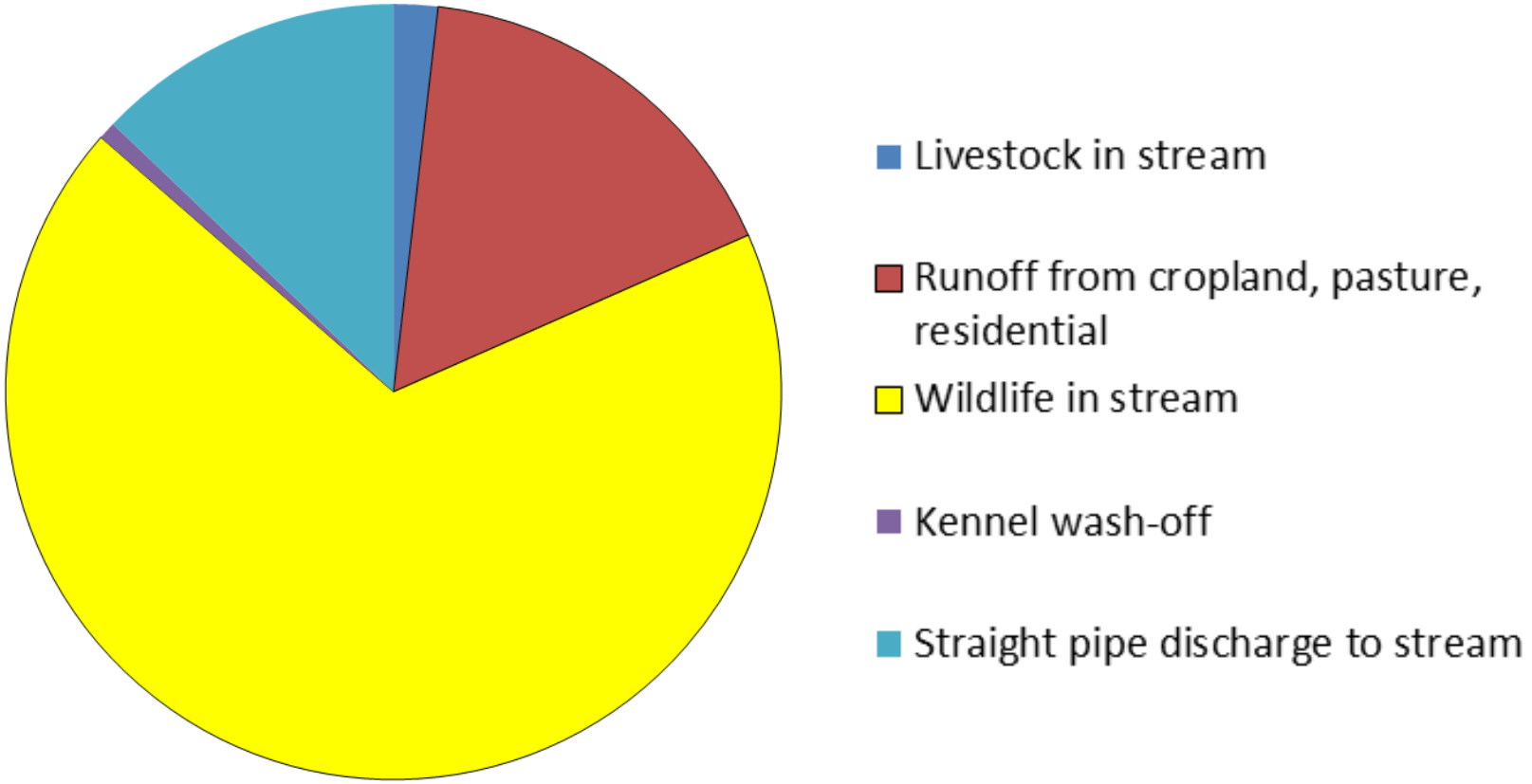
Sources of Bacteria

Darden Mill Run



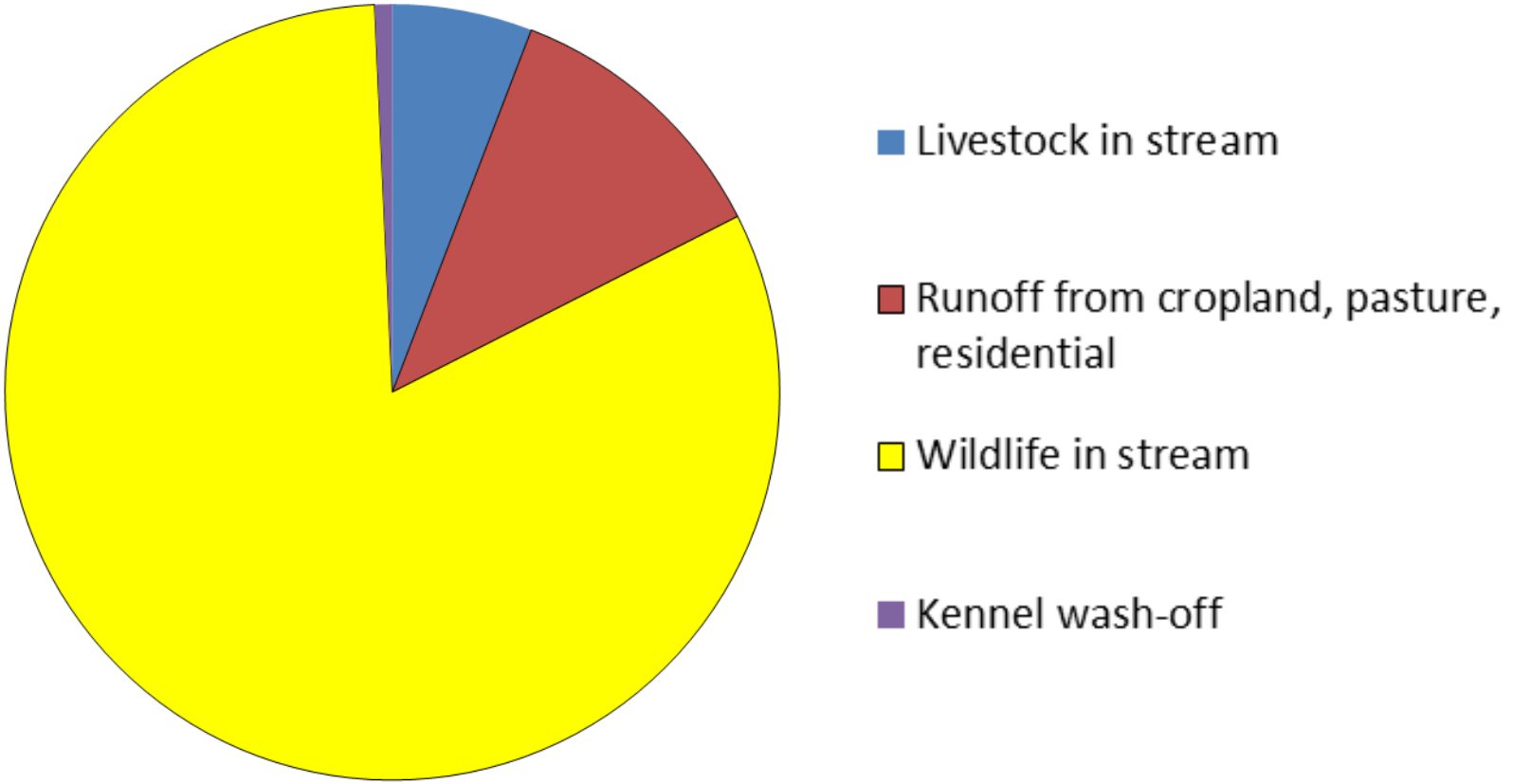
Sources of Bacteria

Mill Swamp



Sources of Bacteria

Three Creek



Required Bacteria Reductions (%)

Impaired Watershed	E. Coli Reduction from Source Category (%)						
	Livestock Direct Deposit	Loads from Pasture	Loads from Cropland	Straight Pipes and Failing Septic Systems	Loads from Residential Areas*	Kennel Wash-off	Wildlife Direct Deposit
Darden Mill Run	95	0	0	100	0	75	65
Mill Swamp	0	0	0	100	0	0	0
Three Creek (upper)	75	75	75	100	75	55	50
Three Creek (middle)	90	0	0	100	0	45	85

- Reductions from wildlife sources would be needed in order to never exceed the bacteria standard, however, wildlife reductions will not be called for in the plan, and are not necessary to eliminate the impaired status.

Summary of TMDL study

- All straight pipes and failing septic systems in the area need to be corrected
- Kennel wash-off needs to be reduced in Three Creek and Darden Mill Run
- Nearly all livestock must be excluded from streams in upper and middle Three Creek and Darden Mill Run
- Bacteria loads from pasture, cropland and residential lands must be reduced in upper Three Creek

TMDL Process

Total
Maximum
Daily
Load

We are here

Study

Clean-up Plan

Monitoring

• What will it take to fix the problem?

• How can those fixes be implemented?

Implementation

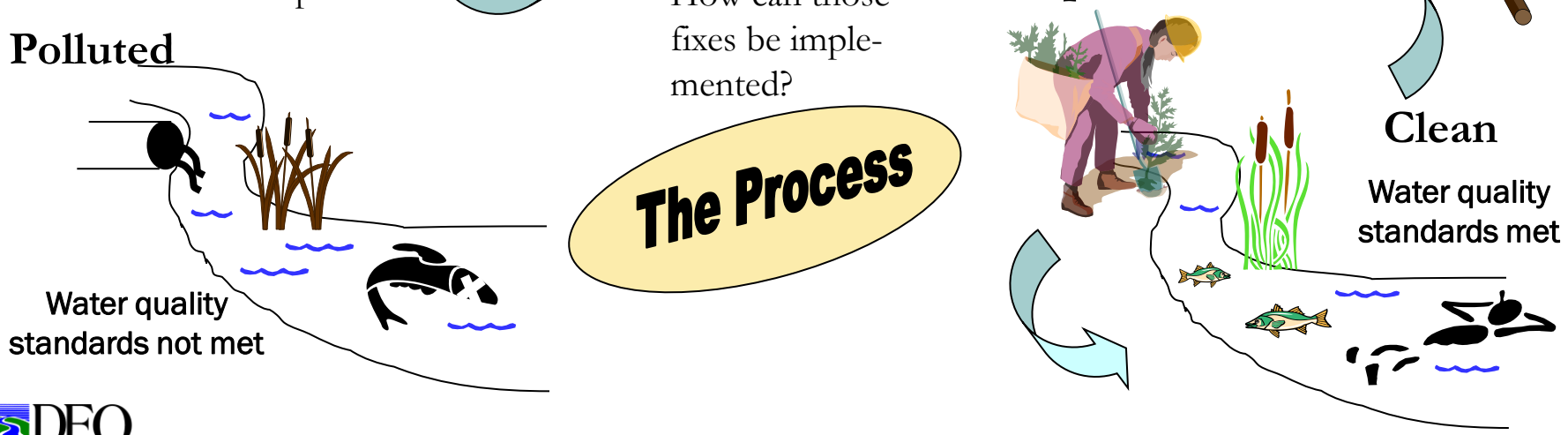
Polluted

Water quality standards not met

The Process

Clean

Water quality standards met



Graphic adapted from Dr. Robert Brent, Virginia DEQ

TMDL Implementation Plan Outline

1. Introduction
2. State and Federal Requirements for TMDL Implementation Plans
3. Review of the Reed Creek Bacterial TMDL Studies
4. Public Participation
5. Implementation Actions
6. Measurable Goals and Milestones
7. Stakeholders Roles and Responsibilities
8. Integration with Other Watershed Plans
9. Potential Funding Sources
10. References

Appendix A – Glossary of BMP and other Control Measure Definitions

Appendix B – BMP Codes and Practice Names

Public Participation

- Public Meetings
  - Informational
  - Solicit public participation
  - Provide a forum for public comment
- Working Group
  - Address “community” issues/concerns
  - Directs the overall process
  - Coordinates transition to implementation

TMDL IP Development

February 12, 2012	First Public Meeting
March 30, 2012	Working Group meeting
September 14, 2012	Working Group meeting
January 11, 2013	Working Group meeting
March 21, 2013	Final Public Meeting
March 21 – April 19, 2013	Comment Period for Implementation Plan

Assessment of Needs

- Identification of best management practices (i.e. water quality improvement projects)
- Quantification of practices
  - Spatial Analysis
  - BMP Database Analysis
  - Input from Work Groups
- Technical Assistance and Education

Residential Practices

- Replace ALL straight pipes
- Repair/replace failing septic systems

How?

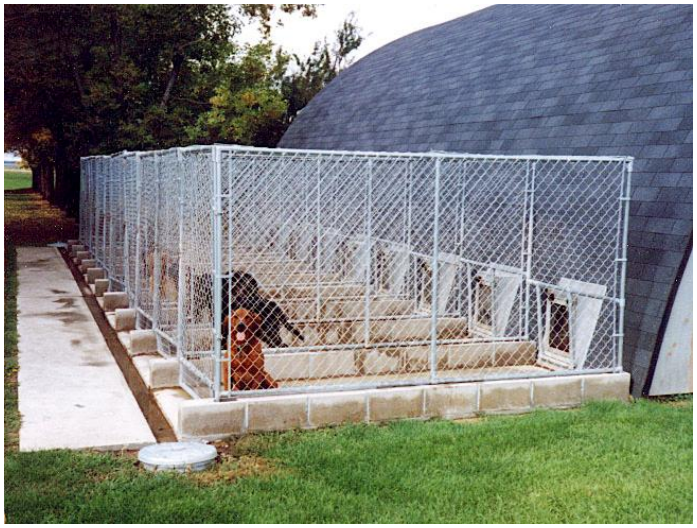
- Septic Tank Pump-out (RB-1)
- Septic System Repair (RB-3)
- Septic System Installation/ Replacement (RB-4)
- Alternative Waste Treatment Systems (RB-5)

Residential Practices

- Develop a pet waste education program
- Reduce kennel wash-off

How?

- Provide educational materials describing appropriate pet waste management practices
- Divert kennel wash-off
  - Trenches to divert wash-off from stream
  - Composting dog waste
  - Commercial pet waste digesters



Quantification of Residential Practices

Watershed	Septic system repair	Alternative waste treatment system	Septic system replacement	Septic tank pump-out	Pet waste education program	Kennel wash-off diversions
Darden Mill Run	14	3	1	24	1	7
Mill Swamp	7	3	2	24		0
Three Creek	58	15	5	175		14

Cost Estimates- Residential

Practice	Unit	Unit Cost	Cost by watershed		
			Darden Mill Run	Mill Swamp	Three Creek
Septic Tank Pump-out (RB-1)	pump-out	$250	$6,000	$6,000	$43,750
Replacing Straight Pipes					
Conventional Septic System (RB-4)	system	$8,000	$8,000	$8,000	$40,000
Alternative Waste Treatment System (RB-5)	system	$20,000	$60,000	$40,000	$300,000
Repairing Failing Septic Systems (RB-3)	repair	$3,500	$49,000	$24,500	$203,000
Replacing Failing Septic Systems					
Conventional Septic System (RB-4)	system	$8,000	$0	$8,000	$0
Alternative Waste Treatment System (RB-5)	system	$20,000	$0	$20,000	$0
Pet Waste Education Program	program	$5,000	$1,250	$0	$3,750
Kennel Wash-off Diversions	system	$500	$3,500	$0	$7,000
TOTAL ESTIMATED COST			$127,750	$106,500	$597,500

Agricultural Practices

- Livestock Exclusion with Riparian Buffers (LE-1T and CRSL-6)
  - Stream exclusion fencing
  - Off-stream water source
  - Riparian buffers >= 35 feet
- Livestock Exclusion with Reduced Setback (LE-2T)
  - Same as above EXCEPT
  - Riparian buffers >= 10 feet

Photos: Virginia Department of Conservation and Recreation

Agricultural Practices

- Improved Pasture Management
  - Soil testing
  - 3-inch min. grass height
  - Cross fencing
- Conversion of Pasture to Forest (FR-1)
- Permanent Vegetative Cover on Critical Areas
- Water Control Structures (WP-1)

Agricultural Practices

- Field Borders (WL-1)
- Idle Land (WL-2)
- Fescue Conversion (WL-3)
- Continuous No-till (SL-15A)
- Harvestable Cover Crop (SL-8H)
- Small Grain Cover Crop (SL-8b)
- Grass Buffers (WQ-1 and CRWQ-1)

Quantification of Agricultural Practices

Exclusion System		Linear Feet of Livestock Exclusion		
		Darden Mill Run	Three Creek (middle)	Three Creek (upper)
LE-1T		7,926	529	1,304
LE-2T		1,981	132	326
CRSL-6		3,302	220	544
TOTAL	**Feet**	**13,209**	**881**	**2,174**
	Miles	**2.5**	**0.17**	**0.41**

BMP	Units	Extent Required
Improved Pasture Management	acres	**2,067**
Reforestation of Erodible Pasture	acres	**689**
Permanent Vegetative Cover on Critical Areas	acres	**6**
Water Control Structures	acres-treated	**930**

BMP	Units	Extent Required
Field Borders/Wildlife Option	acres	**33**
Idle Land/Wildlife Option	acres	**34**
Fescue Conversion/Wildlife Option	acres	**33**
Continuous No-till	acres	**472**
Harvestable Cover Crop	acres	**378**
Small Grain Cover Crop	acres	**377**
Grass Buffers	acres	**2**
CREP Grass Buffers	acres	**3**

Cost Estimates- Agricultural

Practice	Unit	Unit Cost	Cost by watershed	
			Darden Mill Run	Three Creek
Livestock Exclusion – Riparian Buffers (LE-1T)*	system	$15,000	$135,000	$45,000
Livestock Exclusion – Reduced Setback (LE-2T)*	system	$11,000	$11,000	$0
CREP Stream Exclusion (CRSL-6)*	system	$15,000	$60,000	$30,000
Improved Pasture Management (EQIP 512, EQIP 528)	acre	$110	$0	$227,370
Reforestation of Erodible Pasture (FR-1)	acre	$95	$0	$65,455
Permanent Vegetative Cover on Critical Areas (SL-11)	acre	$2,800	$0	$16,800
Water Control Structures (WP-1)	acres-treated	$360	$0	$334,800
Field Borders/Wildlife Option (WL-1)	acre	$260	$0	$8,580
Idle Land/Wildlife Option (WL-2)	acre	$150	$0	$5,100
Fescue Conversion/Wildlife Option (WL-3)	acre	$300	$0	$9,900
Continuous No-till (SL-15A)	acre	$95	$0	$44,840
Harvestable Cover Crop (SL-8H)	acre	$35	$0	$13,230
Small Grain Cover Crop (SL-8B)	acre	$35	$0	$13,195
Grass Buffers (WQ-1)	acre	$180	$0	$360
CREP Grass Buffers (CRWQ-1)	acre	$180	$0	$540
TOTAL ESTIMATED COST			$206,000	$815,170

Benefits of Implementation

- Meet water quality standards
- Improved livestock health

- Improved recreational opportunities
- Improved human health

Potential Funding Sources

- Virginia Ag. BMP Cost-Share Program
- CREP- Conservation Reserve Enhancement Program
- Virginia DGIF - Landowner Incentive Program
- Virginia Water Quality Improvement Fund
- USEPA- Clean Water State Revolving Fund
- Southeast RCAP – Southeast Rural Community Assistance Project

Water Quality Milestones

Milestone 1: Less than 10.5% violations of the instantaneous *E. coli* bacteria criterion (235/100 mL) at each watershed outlet – achieved in 5 years

Milestone 2: 0% violations of the geometric mean *E. coli* bacteria criterion (126/100 mL) at each watershed outlet – achieved in 10 years

Implementation Milestones – upper Three Creek

BMP Type	BMP	Units	Stage 1	Stage 2
Direct Deposition	Livestock Exclusion with Riparian Buffers	system	2	-
	Livestock Exclusion with Reduced Setback	system	-	-
	CREP Stream Exclusion	system	1	-
Pasture	Improved Pasture Management	acres	-	2,067
	Reforestation of Erodible Pasture	acres	-	689
	Permanent Vegetative Cover on Critical Areas	acres	-	6
	Water Control Structures	acres-treated	-	930
Cropland	Field Borders/Wildlife Option	acres	-	33
	Idle Land/Wildlife Option	acres	-	34
	Fescue Conversion/Wildlife Option	acres	-	33
	Continuous No-till	acres	-	472
	Harvestable Cover Crop	acres	-	378
	Small Grain Cover Crop	acres	-	377
	Grass Buffers	acres	-	2
	CREP Grass Buffers	acres	-	3
Residential	Pet Waste Education Program	program	1	-
	Kennel Wash-off Diversion	system	-	7
Septic	Septic Tank Pump-out	system	34	-
	Septic Tank System Repair	system	10	-
	Septic Tank System Installation/Replacement	system	1	-
	Alternative On-site Waste Treatment System	system	3	-

Implementation Milestones – Darden Mill Run, Mill Swamp and middle and lower Three Creek

BMP Type	BMP	Units	Darden Mill Run	Mill Swamp	Three Creek (middle)	Three Creek (lower)
Direct Deposition	Livestock Exclusion with Riparian Buffers	system	9	-	1	-
	Livestock Exclusion with Reduced Setback	system	1	-	-	-
	CREP Stream Exclusion	system	4	-	1	-
Residential	Pet Waste Education Program	program	1	-	1	-
	Kennel Wash-off Diversion	system	7	-	7	-
Septic	Septic Tank Pump-out	system	24	24	60	81
	Septic Tank System Repair	system	14	7	28	20
	Septic Tank System Installation/Replacement	system	1	2	2	2
	Alternative On-site Waste Treatment System	system	3	3	7	5

Proposed Monitoring Sites

Virginia Department of Environmental Quality Monitoring Stations

VADEQ Station ID	Stream Name	Station Location
5ADMR008.42	Darden Mill Run	Route 673 Bridge
5AMSP000.16	Mill Swamp	Route 731 Bridge
5ATRE008.48	Three Creek	Route 655 Bridge
5ATRE016.02	Three Creek	Route 649 Bridge
5ATRE022.05	Three Creek	Route 615 Bridge
5ATRE038.07	Three Creek	Route 610 Bridge

Local Implementation Steps

- Darden Mill Run, Mill Swamp and Three Creek TMDL Implementation Team
  - Purpose
  - Membership
  - Organizational Meeting
  - Contact Person

Contacts

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Karen Kline, Virginia Tech
voice: 540.231.0094
e-mail: klinek@vt.edu

Copies of this presentation, the draft Public Document, and the draft Technical Report can be found at:

ftp://bsesrv214.bse.vt.edu/Kline/ThreeCrk_DardenMillRn_MillSwp/

And:

http://www.deq.virginia.gov/Programs/Water/WaterQualityInformationTMDLs/TMDL/TMDLImplementation.aspx

Where do we go from here?

- 30-Day Comment Period for the Plan
  - ftp://bsesrv214.bse.vt.edu/Kline/ThreeCrk_DardenMillRn_MillSwp/
  - http://www.deq.virginia.gov/Programs/Water/WaterQualityInformationTMDLs/TMDL/TMDLImplementation.aspx
- All comments go to Jennifer Howell, VDEQ
  - (757) 518-2111
  - Jennifer.Howell@deq.virginia.gov
  - 5636 Southern Blvd, Virginia Beach, VA 23462
- Continue your involvement!
  - Clean-up Team
  - Citizen Monitoring
  - Local group activities

Thank you!